

REMARKS

In the specification, the third and fourth paragraphs on page 2 and continuing onto page 3 have been amended to further track amendatory language of the claims. The fourth paragraph on page 6 has been amended to correct a typographical error.

Claims 1-5 are pending in this application. Claims 3 and 4 have been withdrawn from examination as being directed to a non-elected species.

Claim 1 has been amended.

No new subject matter has been added by this amendment.

35 U.S.C. §103(a)

Claims 1, 2, and 5 stand rejected under 35 U.S.C. §103(a) for obviousness over U.S. Patent No. 1,762,198 to Shone, in view of U.S. Patent No. 4,093,052 to Falk. In view of the following remarks, the applicant respectfully requests reconsideration of these rejections.

The present invention is directed to a dividing head using a multiple lead type worm. The dividing head is used for carrying out annular division of a circular table. A worm wheel is assembled into a worm wheel shaft attached to a circular table. A hollow worm body includes multiple lead type worm teeth. A drive shaft is fitted into a hollow portion of the worm body. An assembler has an annular portion, which is coaxial with the drive shaft. The assembler displaces radially to press the worm body and the draft shaft to couple both by frictional engagement.

The dividing head of the present invention is also known as an index device or an index apparatus. The dividing head is an apparatus which rotates a circular table for use with a machine tool, such as a milling machine. Independent claim 1 has been amended to clarify that the dividing head rotates the circular table and carries out an angular division. Support for this amendment can be found, for example, in the last paragraph of page 6.

The worm with multiple lead type worm teeth is described in the specification in lines 7-16 on page 7. The worm with multiple lead type worm teeth is a worm in which the leads are slightly different at one side and the other side of the teeth facing the axial (rotational) direction, so that the thickness dimension of the worm teeth gradually increases

from one side toward the other side in the direction of the rotation axis of the worm body. Consequently, the backlash between the worm and the worm wheel can be readily adjusted by moving the worm in its axial direction relative to the worm wheel meshed with the worm.

The Shone patent is directed to a device for automatically feeding lubricant to parts that need lubrication, such as bearings in a carrier device for automobiles and the like. Figure 1 of the Shone patent illustrates a timing mechanism for feeding lubricant to such parts as bearings at certain timing. The worm of the Shone patent does not include multiple lead type worm teeth, as recited by amended independent claim 1.

The Falk patent is directed to an assembler, but does not relate to a dividing head for angularly dividing a circular table. Therefore, the Falk patent does not teach or suggest the elements of the present invention. Neither the Shone patent, nor the Falk patent, discloses a worm divided into a worm body in a drive shaft, where the worm body is disposed in the drive shaft so as to move in the axial direction of the drive shaft, and the worm body is assembled into a pre-determined position of the drive shaft by an assembler. Even if the inventions of the Shone and the Falk patents were combined, this would only teach a drive shaft moving in its axial direction when adjusting the backlash. Neither Shone nor Falk teaches or suggests adjusting backlash by rotating the worm body relative to the drive shaft. Therefore, the Shone patent, in view of the Falk patent, cannot teach or suggest the claimed invention.

For the foregoing reasons, the applicant believes that the subject matter of amended independent claim 1 is not rendered obvious by the Shone patent, in view of the Falk patent.

Claims 2-5 depend from, and add further limitations to, amended independent claim 1, or a subsequent dependent claim, and are believed to be patentable for the reasons discussed hereinabove in connection with amended independent claim 1. Reconsideration of the rejections of claims 2 and 5 is respectively requested. Also, in light of allowability of claim 1, the Examiner is requested to reinstate and allow dependent claims 3 and 4.

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In view of the foregoing, the applicant believes that claims 1-5 are in condition for allowance. Reconsideration of the Examiner's rejections and allowance of claims 1-5 are respectfully requested.

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